

HaggleBD

An Online Auction Based Android Application



This project is submitted in partial fulfillment of the requirement for the degree of
Bachelor of Science in Computer Science & Engineering.

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June 12, 2022

CERTIFICATE OF APPROVAL

The project titled “**HaggleBD an Auction Based Android Application.**” submitted by Sadia Afrin, ID No. 163014023, has been accepted as satisfactory in fulfillment of the requirement for the degree of Bachelor of Science in Computer Science & Engineering (CSE) as B.Sc. Engineering to be awarded by the University of Liberal Arts Bangladesh (ULAB).

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STATEMENT OF ORIGINALITY

I declare that this project report entitled “HaggleBD an Auction Based Android Application.” is the result of my own work except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

.....

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ACKNOWLEDGEMENT

First and foremost, I give thanks to Allah, the Almighty, the Greatest of All, on whom I rely for my survival and direction. I'd like to express my gratitude to Almighty Allah for providing me with the chance, determination, and strength to accomplish my final year project. His unfailing love and mercy were with me throughout my life, and they were with me even more during the duration of my endeavor.

Now I'd want to thank my supervisor, Muhammad Golam Kibria, PhD, Associate Professor, Department of Computer Science and Engineering, University of Liberal Arts Bangladesh (ULAB), for his unwavering support, advice, and encouragement. He is a person of morals in addition to being a good supervisor, and I appreciate all of his time, support, and suggestions.

I also appreciate the cooperation of my favorite computer science and engineering faculties, as well as all of my classmates who assisted with pleasant conversations, recommendations, and criticisms.

ABSTRACT

An e-commerce platform is an application that enables both the seller and the customer to participate. In essence, a consumer should be able to use an e-commerce platform to find things, shop around with a basket, and then check out. Selling and Buying products through bidding is not a rare scenario in the world, it may say that it can be seen mostly in the developed countries where online business are growing rapidly. But developing country like Bangladesh has a unusual plot that online auctioning or bidding system has been used. To buy or sell products thorough online bidding system, buyers or sellers may get a good value from their products. In contractual bridge, a bidding system is a set of agreements and understandings that are allocated to calls and sequences of calls utilized by a collaboration, and it provides a detailed definition of the significance of each procedure and protocol. Bidding system works like there is a minimum bid price and last bid time have given, users who want to buy they must have given a bid price more than the given minimum bid price and the last given bid price by other users within the last bid time. Users can be allowed to bid after the last bid price. A bid winner will be selected by the system who has bid prices more than others. Selling and buying will grow gradually as it is a new e-commerce system for Bangladesh, and users may get their valuable benefits by using this platform.

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Chapter 1

Introductions

1.1 Introductions

An auction is a method of buying and selling products or services by putting them up for bids, taking bids, and then selling or buying the item from the highest or lowest bidder. The goal of this project is to create an auction-based Android application that allows e-commerce customers to buy things by bidding the highest among all users or sell their products by simply adding them to this platform. This Android app allows to log in as a user. There are no restrictions on roles. Everyone has the ability to buy or sell their goods. The number of people using the Internet is steadily increasing. Users can use the internet to log into an Android application to browse for a product they want to purchase or sell.

1.2 Motivations

There are a variety of auction-based applications [2][1] in many other countries, but there is no such well-known application in Bangladesh's online market. Nowadays, online marketing or online is the place where a diverse and evolving set of Internet-based digital techniques are used to reach targeted audiences. Content marketing, social media, websites, search engine optimization, online

video, email marketing, paid search, and other strategies are among them. As a result, having an online auction-based marketing strategy is essential.

1.3 Objectives

Users of the e-commerce platform will be the primary users of the application. It will enable users to sell and purchase their products. A user can list his things for sale as well as bid on other users' products for purchase. This application's major purpose will be to introduce an online-based auction marketing platform.

- Sell products.
- Buy products by bidding.
- Initiate a bid based e-commerce platform.
-

1.4 Expected Outcome

The desired objective is for customers to become accustomed to using the app and to use it as their primary e-commerce platform. Users can look up information about things to buy them and upload information to sell them to other users. If they use this application as their selling and buying platform, they will save significant time and money.

- Consumers may find this app as their best e-commerce platform.
- More users, more products, more sells & buys.

1.5 Scope of the Problem

With the amount of mobile applications on the rise since their creation, there's a good risk yours may go overlooked. It's not only about getting things done by your developers when it comes to developing a mobile app.

Mobile applications, like any other business process, must be planned, brainstormed, and built to meet end-user needs.

- Select the Proper Platform.
- Performance.
- Security measures.
- Conduct market research.
- Build a minimum viable application.
- Considering the opportunities.
- Identify how to profit from an application.

In our country, the e-commerce platform sellers & buyers don't use any auction-based platform, because there is no well-known online auction platform available in Bangladesh. Auction is a good way to sell and buy products, and there may exist a lot of competitors to buy or sell products. But if there is a platform where they may sell & grab a product with a good value of money. So a country like Bangladesh has to need to introduce with the online auctioning system.

1.6 Project Management & Finances

Project finance management is an important part of good project management since it focuses on important business indicators. To get a thorough picture of each project, key aspects like budget consumption, income, cash cycle management, and project funding must be constantly mapped. Furthermore, the correct financial management rules, risk and control management, and strategies can all contribute to improve transparency.

I did not require any funding to develop this program, and practically all software tools and databases, with the exception of gitKraken, were freely available. gitKraken is a git controlling UI system that provides users greater flexibility in version control and storing code in repositories. It costs \$7.95 per month, however I was able to get it for free with my GitHub student developer pack. This application would be more useful if I spent some money on a cloud-based function execution system rather than relying on free software.

1.7 Challenges

Several businesses are now understanding the value of having a well-designed app. As a result, the need for mobile app development services and mobile app development companies is growing. Several smartphone app development companies claim to be able to meet this demand. As a result, amid the ever-growing ecosystem of apps, it's critical for participants to create what works and what doesn't. However some critical challenges that not only just

I have faced but also every developer has been facing day by day.

- Creating a world-class application.
- Cross-platform applications.
- Interactive apps.
- Battery consumption and performance
- Keep the application simple.
- Security & Involving end user.
- Choosing development technology.

While working in HuggleBD, the whole system is new to me. Learning about these new technologies and implementing those by reading different official documentation. It is and will be a great challenge for me to cope up with new technologies and tools.

- Learning new framework and Implementing it.
- Mapping data from Firebase Cloud-Firestore.
- Learning a whole new language name Dart.
- All information to connected into the database.
- Maintenance of the application and database.
- Create a user-friendly and responsive application.

1.8 Report Layout

There are seven chapters in this report. The following is a summary of the project layout for this paper :

Chapter 1 : I've provided an overview of the project "HaggleBD" as well as the reasoning behind it. This section also includes objectives, projected outcomes, and project management.

Chapter 2 : Here, I'll explain why I picked this project and why I want to develop it, as well as some past comparable works with comparative studies and the project's problems.

Chapter 3 : The use case modeling, requirement analysis and implementation requirements are all covered in this section.

Chapter 4 : In this, I'll go over the front-end and back-end design specifications, as well as interaction design and user experience.

Chapter 5 : Inside this part, I'll go over the testing results and explain how they work. Testing and test reports are also included.

Chapter 6 : This chapter discussed the project's impact on people and the environment, as well as the project's ethical issues, environmental impact, and long-term viability.

Chapter 7 : In the final chapter, I will summarize the entire project's activities and discuss some of the project's future intentions.

Chapter 2

Background

2.1 Preliminaries

Users - A number of persons who will use and interact with this application.

Posts - This includes various products or item which will be sold or purchased by the users.

Min-Bid-Price - The least price to hike for purchasing an item or product.

Bid - The Users who want to purchase a product from other users, will hike a price equal or more than Min-Bid-Price what will be given by the seller.

Last Bid Time - The given time for the users to purchase, users must make a bid before ending of this period.

Android - The most known and usable platform, where this application will run [5].

Flutter - An open-source UI software development kit, has used to build this application.[6].

Dart - A programming language, required for Flutter, designed for client development, such as for the web and mobile apps[7].

Firebase - A back-end API for cloud database, authentication & so more [8].

Cloud Firestore - A flexible, scalable database for mobile, web, and server development from Firebase and Google Cloud [9].

Cloud Storage - Cloud Storage for Firebase is built for app developers who need to store and serve user-generated content, such as photos or videos [10].

Sign in with Google - Seamless sign-in and sign-up flows by using Google Account [11].

2.2 Related Works

In some countries, premium subscriptions to auction management software are available; they are highly sophisticated, and some novice users may find it difficult to navigate through the software due to its complex user interface. However, there is no auction-based software available in Bangladesh's online market. This project on auction managing will be the simplest for customers to browse and will be a free application.

Case/System	eBid	Ally Smart	HaggleBD
Login Process	Email and Password	UserID and Password	One Click login with Google Account
Payment	Zero listing fees and a maximum 3% selling fee	A small amount/month	No fee required
Features	High computer proficiency and sophistication are required.	Computer literacy and sophistication are required.	Simple and easy to use
Security	Yes	Yes	Yes
System Type	Web	Web	Android
Available in Bangladesh	No	No	Soon

Table 2.1: Comparison with eBid [1] and Ally Smart [2].

Most of the Auction management software system, mentioned here, have highly detailed user interface and some attractive graphical design. HaggleBD focuses on the Auction based system application with numerous features such users can find it their comfort zone for selling and buying products. The user interface is based on graphical user interface and make easier for the user to operate and understand each of it's feature. It does not have payment system

right now but in future payment system will be integrated. It does not have any sophisticated functions where user could confuse with others functions.

Case/System	Handbid	Click Bid	HaggleBD
Login Process	Email and Password	Email and Password	One Click login with Google Account
Payment	\$792 per year	Annual Event License \$795	No fee required
Features	High computer proficiency and sophistication are required.	Computer literacy and sophistication are required.	Simple and easy to use
Security	Yes	Yes	Yes
System Type	iOS, Android, Web	Web	Android
Available in Bangladesh	No	No	Soon

Table 2.2: Comparison with Handbid [3] and Click Bid [4].

Let see some interface of mentioned related works, how they look -

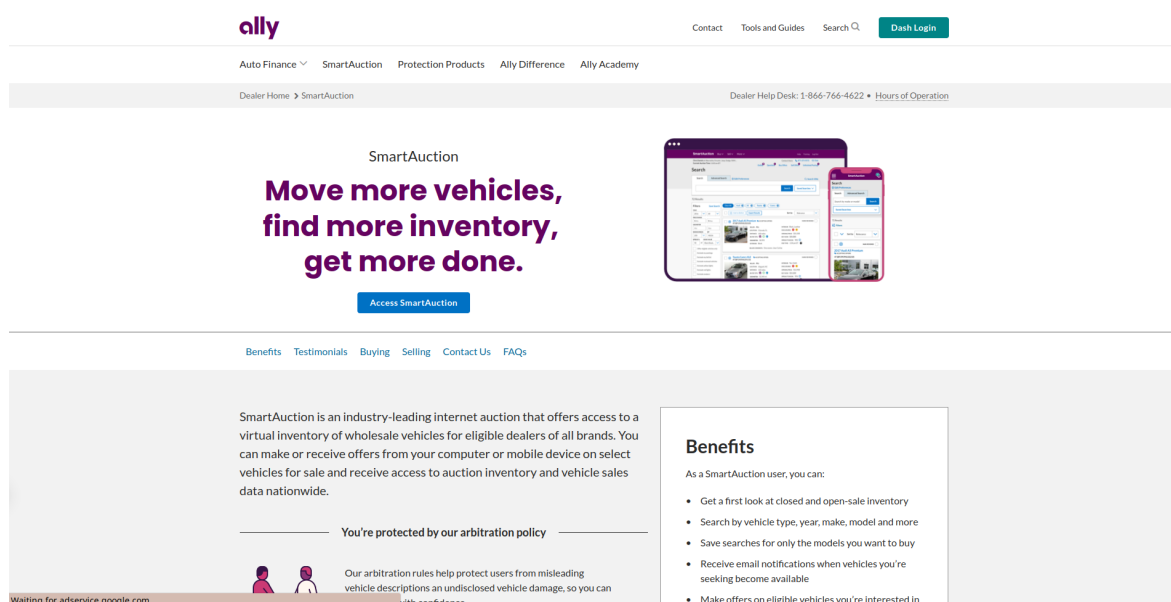


Figure 2.1: First Page of AllySmart

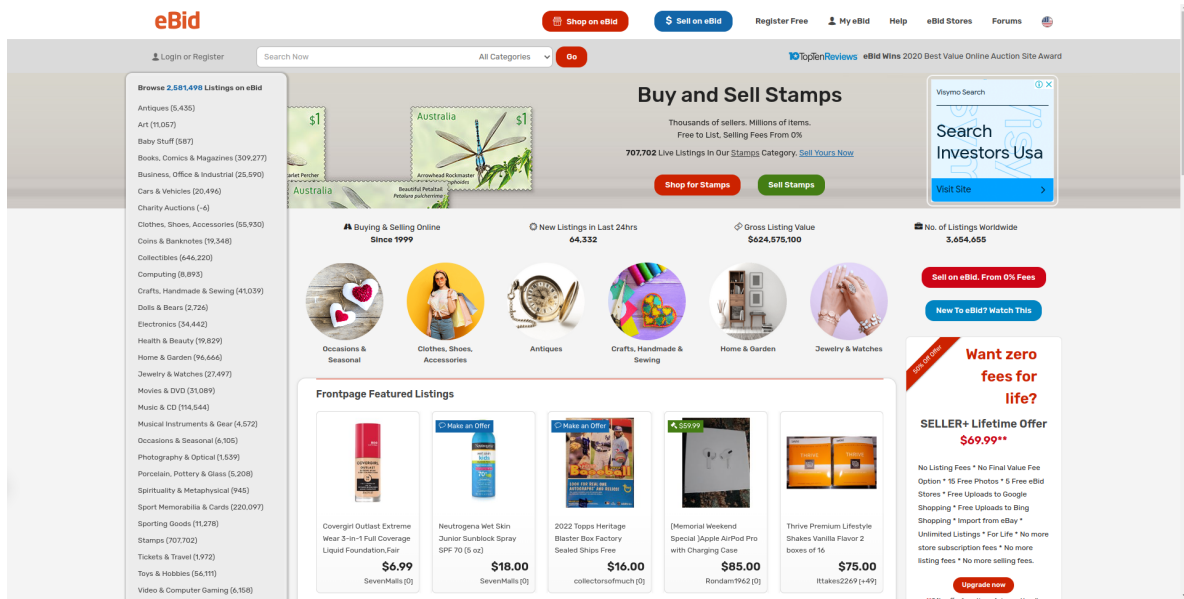


Figure 2.2: First Page of eBid



Figure 2.3: First Page of Handbid



Figure 2.4: First Page of Click Bid

Above the mentioned screenshot, it is seen that the user interfaces are bit complex than our implemented system.

Chapter 3

Requirement Analysis

3.1 Use Case Modeling and Description

The use case diagram depicts how the system's users will interact with it. Users will be able to see, bid on, and add their things for sale and purchase using their Google Accounts, Google will verify the users and stores their data in cloud firestore.

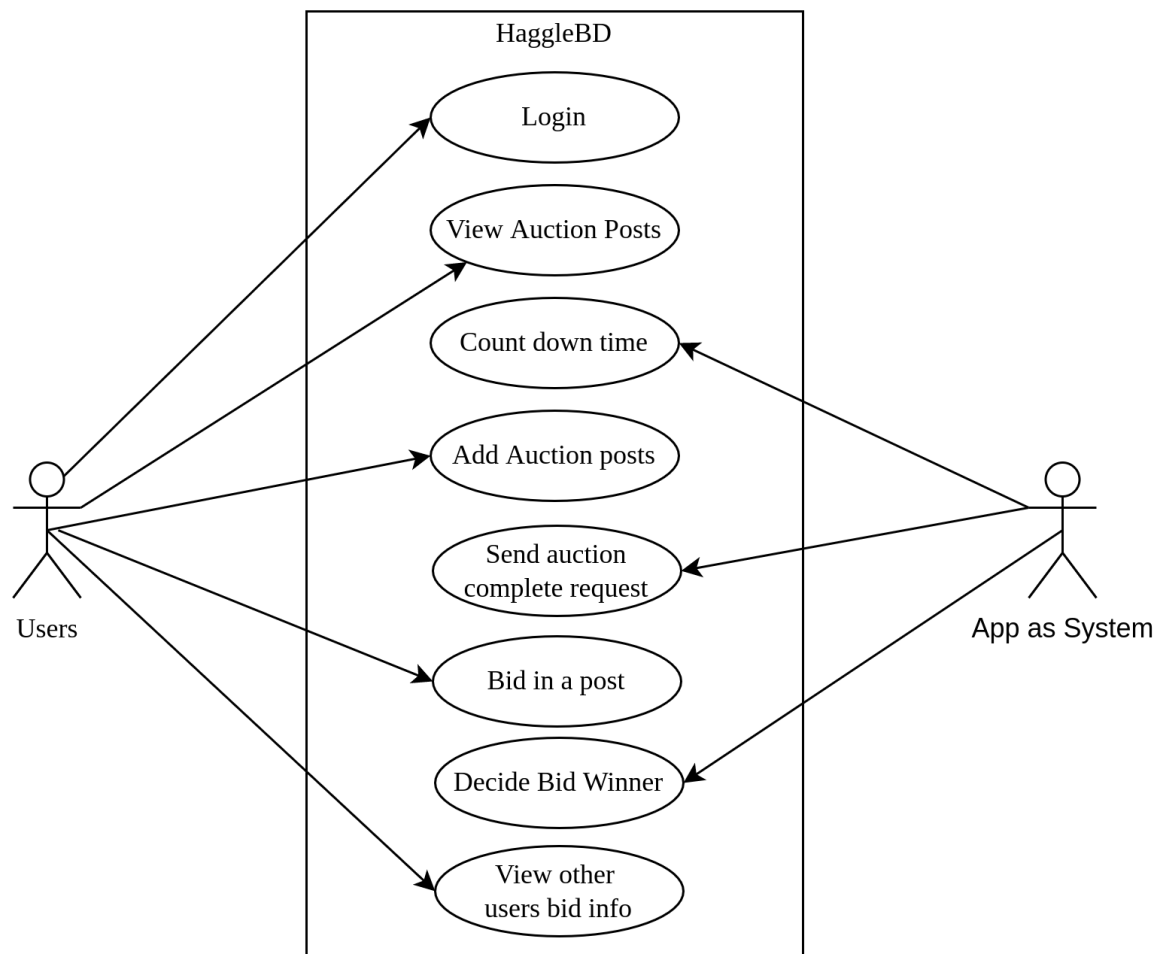


Figure 3.1: Use Case Diagram of HagggleBD

Users who want to purchase a particular product can place bids on other users' products, as well as sell their own. After the last bid time, the app acts as a system to determine who will be the winner and send a complete request to the Firebase cloud. This proposed approach does not necessitate the use of any payments system. Take a look at the diagram [fig 3.1] to discover what the key actions are.

3.2 Requirement Collection and Analysis

The major purpose is to turn this Android application to an auction-based platform in Bangladesh, allowing users of the e-commerce platform to use their monetary system to sell and buy various things. It enables them to adapt to the auctioning system's global digitization and make it conformable for users to interact with.

Among all the SDLC (Software Development Life Cycle), The traditional and the old, Waterfall Model is chosen to develop this application. It is a Software Development Life Cycle model that progresses steadily downward into phases like: Requirement, Design, Implementation, Testing, and Maintenance Analysis

It's one of the most important stages of development for me as I work on this Android app. There are two categories of requirements: Functional Requirements and Non-functional Requirements.

3.2.1 Functional Requirements

A functional requirement is a specification of behavior between inputs and outputs that is used in software development and engineering to specify a function of a system or its component. Calculations, technical details, data manipulation and processing, and other specific functionality that define what a system is expected to perform are examples of functional requirements.

- The application will verify every user account by Sing In With Google.
- It should be able to submit the inputted data by users and send them as request to Firebase.
- This application allow users to add their products for selling.
- It enables users to buy products from others.
- It empowers users to bid other users product.
- The app works as a system to make a bid winner after last bid time.

3.2.2 Non-Functional Requirements

A non-functional requirement is a requirement in system design and requirements engineering that defines criteria that can be used to judge the performance of a system rather than specific behaviors.

- The application is compatible with Android API level 28 to 32.
- It maybe compatible with almost every platform if it may compile from different machines with just the single written code.

- It will show dashboard of the user's profile section about buying and selling.
- This application should be able to log out a user from the system.
- It should be able to provide information for the buyers & sellers about products and users.

3.3 Implementation Requirements

The actual effort of changing requirements into software architectural designs, detailed designs, code, and test cases utilizing various tools and applications is known as implementation requirements. The implementation of these work items is easier if the requirements are clear and, where possible, quantifiable. All of the tools, qualities, and components that were used to construct the app and make it attractive and user friendly to the users are listed in the implementation requirements portion of this report.

I have been using several numbers of tools such as:

- Flutter - The Core Framework to build and design cross-platform application.
- Dart - The Programming Language Flutter works with.
- Android Studio - Environment for building android apps.
- Material Design - For Designing components.
- Firebase - Use for Authentication, Database, Storage.

Above all of the mentioned items, let see and discuss about some of them.

3.3.1 Platform Overview

Android is an open-source platform that allows developers to create any type of user interface they need to build their application. According to the app's criteria, a developer can write in any programming language. As a result, developers may quickly create a variety of apps for user engagement. It includes all of the tools and frameworks needed to create mobile applications fast and effortlessly. HuggleBD has been designed with Flutter and Material Design, the best tools for designing cross platform application right now.

3.3.2 Android Studio

Android Studio is the Android operating system's integrated development environment (IDE). It is meant for Android app development and is based on JetBrains IntelliJ IDEA software. Gradle-based build support, particular refactoring quick fixes, usability, Template-based wizards, and an Android Virtual Device (Emulator) to run and debug apps in the Android Studio are just a few of the features.

3.3.3 Virtual Device

A simulated device is an Android Virtual Device (AVD) that allows a developer to imitate Android devices on their computer in order to test their app without needing to use a physical Android device. Developers can test an Android app or project on a physical device instead of using an Android emulator.

The emulator, on the other hand, is a simple way to test the project.

3.3.4 Cloud Database - Firestore

The Firebase Database from Google is a cloud-based database that stores data in JSON format. Because it is a real-time database, data is synchronized in real-time to all users who are connected. Users' data is saved in the Firebase Cloud Firestore Database, which is a tree-structured NoSQL database. Data validation and security are accessible through the Firebase Cloud Firestore Database. For data storage in HuggleBD, Firebase was utilized to store and synchronize data between users. Firebase Storage was also used to save all of the photographs and construct a URL for each image to be stored in the Cloud Firestore Database.

3.3.5 Device Permissions

By default, Android Operating System restricts all kinds of permission for keeping users' permission strictly, such they may not exploit by third party applications. But when an application will going to perform the operations in android, it will need some permission which will be allowed by that android phone's user. HuggleBD will need :

- Access Internet Connection
- Access Read and Write of the storage

Chapter 4

Design & Implementation

4.1 Front-end Design

Front-end design is the process of creating a graphical user interface for an application using various design tools and frameworks so that users can view and interact with it. Any application or website's front-end design is important since it depicts how data will flow.

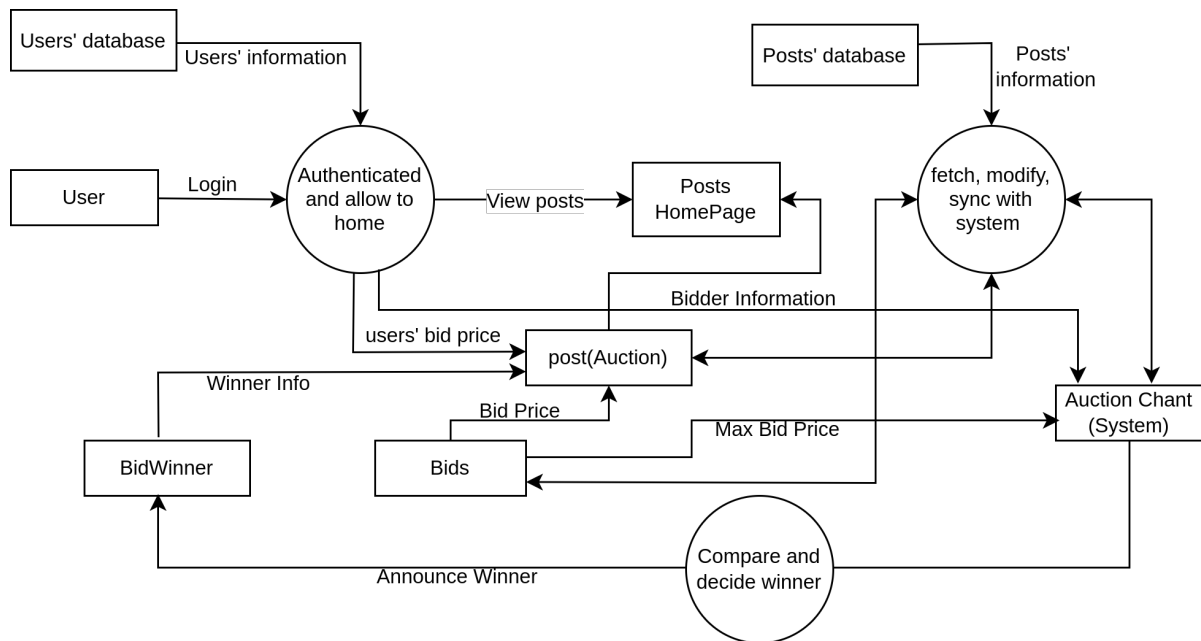


Figure 4.1: Document Flow Diagram

Flutter is a comparatively recent framework that makes it simple to create beautiful cross-platform apps that are also simple to use. We'll create an app that runs on both iOS and Android and looks and feels like it was built directly by utilizing a platform's native components.

Material is a Google design system that enables teams to develop high-quality digital experiences for Android, iOS, Flutter, and the web. It's influenced by the physical environment and its textures, as well as how they reflect light and create shadows. Paper and ink are re-imagined as material surfaces. Graphic design principles — typography, grids, space, scale, color, and imagery — are used in Material Design to create hierarchy, meaning, and focus that engage viewers in the experience. Through subtle feedback and logical transitions, motion focuses attention and preserves continuity. As elements appear on the screen, they alter and reorganize the environment, with interactions resulting in further changes. Material Components are responsive design components that represent attention, selection, activation, error, hover, press, drag, and disabled states through a built-in states system. There are component libraries for Android, iOS, Flutter, and the web. The Front-End design of HagggleBD consists of different kinds of components, some of them are like:-

- Buttons
- Circular Progress
- Modals
- Layout
- Blocks
- Carousel
- Pie Chart

4.2 Back-end Design

A back-end is a program that allows computers and servers to communicate with one another. To improve the front-end app experience, the mobile app back-end server conducts remote activities and processes data. I use APIs to access a hosted back-end, which is hosted on remote servers (application public interface). The remote server has mentioned earlier [8]. A server request is a message that arrives at the server in order to make a request. Sending response from the server to the client in exchange for anything the client wants. Let see how HagggleBD handle the requests to the server.

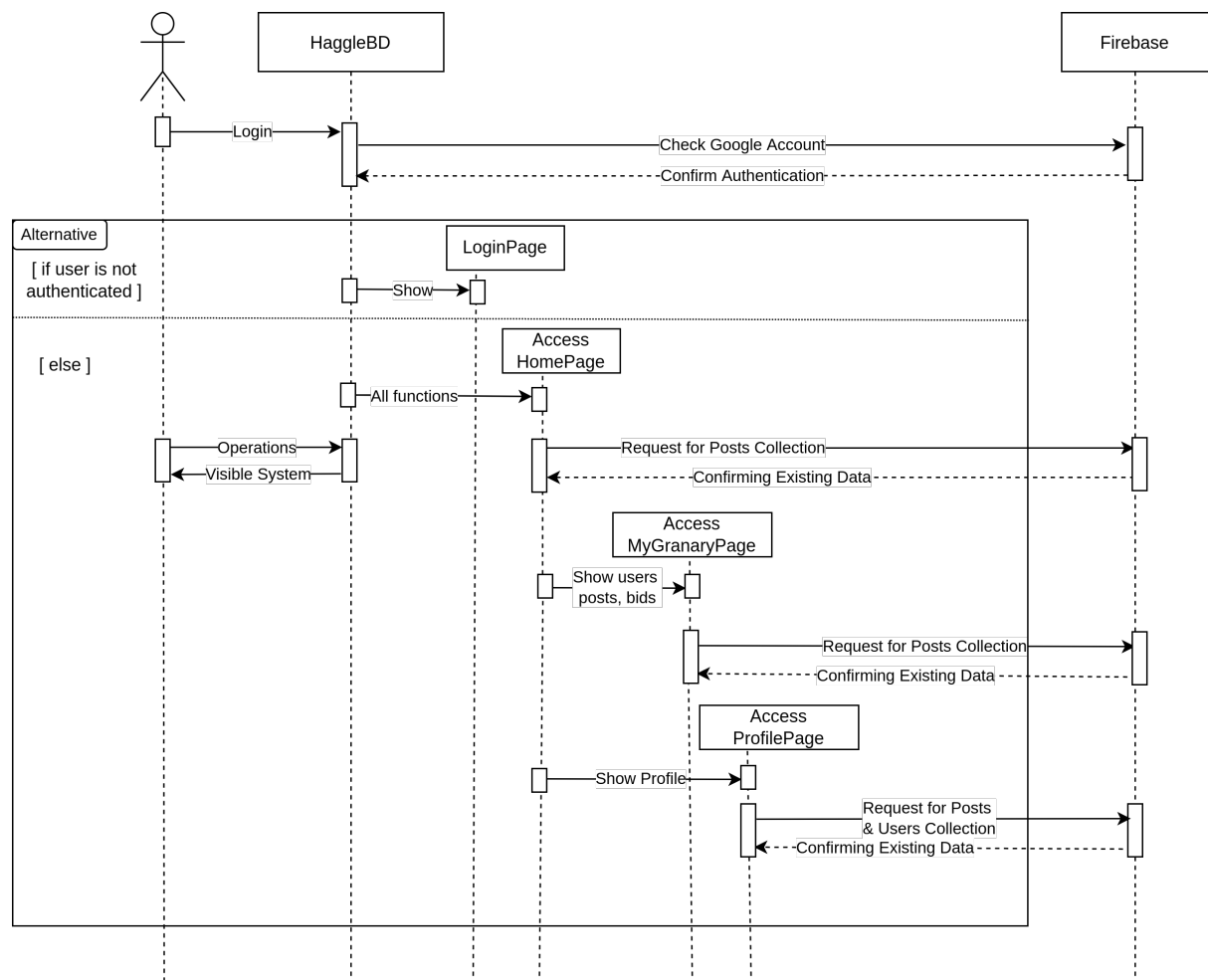


Figure 4.2: Sequence Diagram

I have chosen firebase over any other cloud services, the main reasons are that firebase provides all kind of services for developing application for Mobile or Web Platform like a package, such as we have used :

- Authentication with Google Account [11][12]
- Cloud Firestore (NoSQL Database) [9]
- Cloud Storage [10]

The relationships between entity sets recorded in a database are depicted in how the data and objects are related with each others :

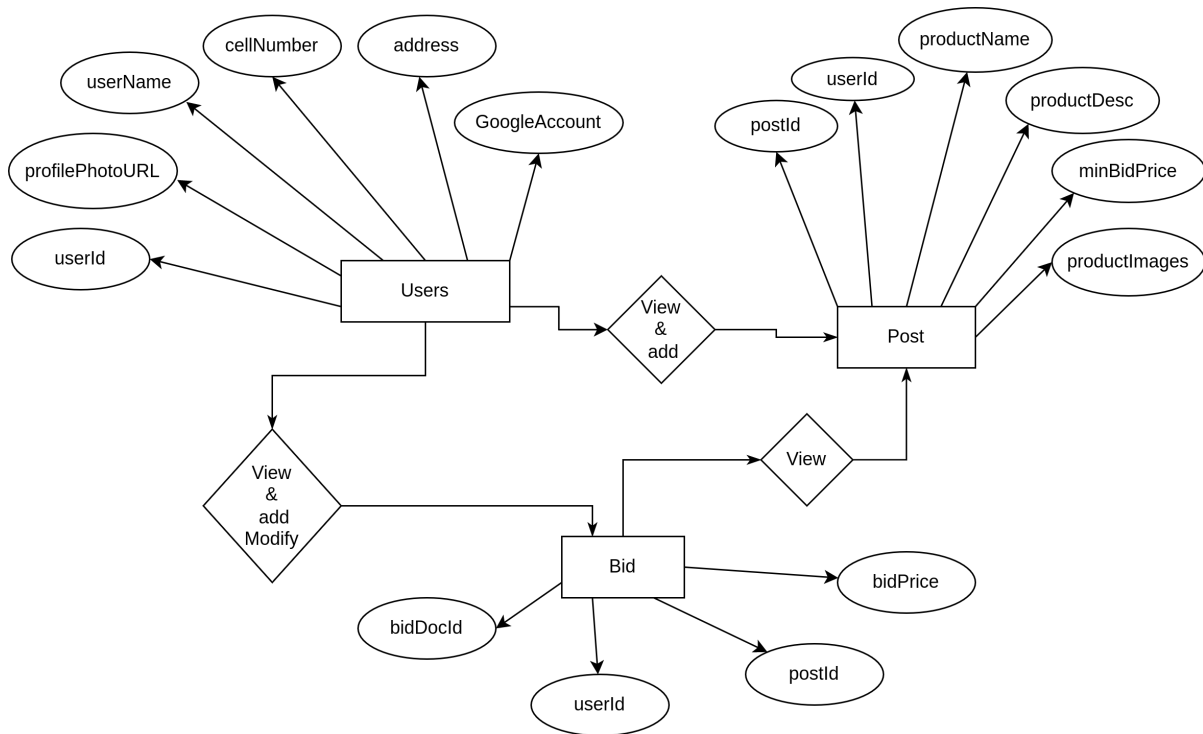


Figure 4.3: Entity Relationship Diagram

4.3 Interaction Design & User Experience (UX)

For any program where users may engage with the system on a regular basis, the visual representation is essential. Users should feel at ease when

interacting, hence the design should be streamlined. Everything should have some sort of significance. The application is interacted with using a physical object, such as the user's finger. As users engage with the object they requested, the loading process and graphic animation vary. So, in order to create a professional android application, I developed the essential buttons, data input field, and graphic components in a meaningful manner based on the goals.

The process by which design create products that give users with meaningful and relevant experiences is known as user experience (UX) design. This includes features of branding, design, usability, and function, as well as the full process of obtaining and integrating the product. It should be considered the Why, What and How of the design use to an application.

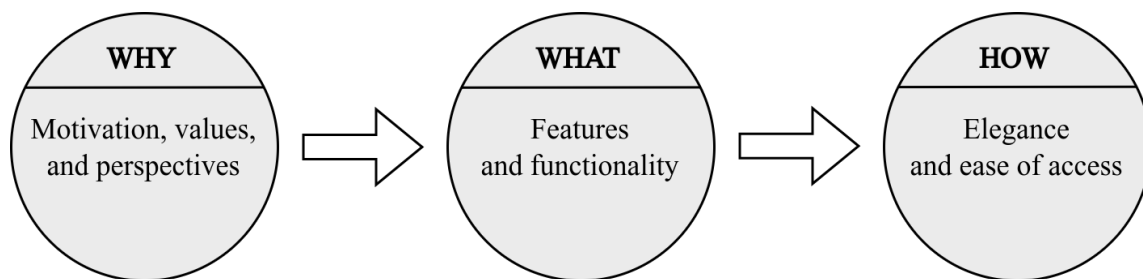


Figure 4.4: The Why, What and How of UX Design

The user is at the center of UX design. UX design is a multidisciplinary profession that spans the full user journey. UX designers come from a variety of backgrounds, including graphic design, programming, psychology, and interaction design. To design for human users, you must consider a broader range of accessibility issues and accommodate many possible users' physical limitations, such as difficulty reading small text. I've followed this iterative UX Design process as a designer and an app developer. The fundamental goal of this application's development is to build software that is both user-friendly

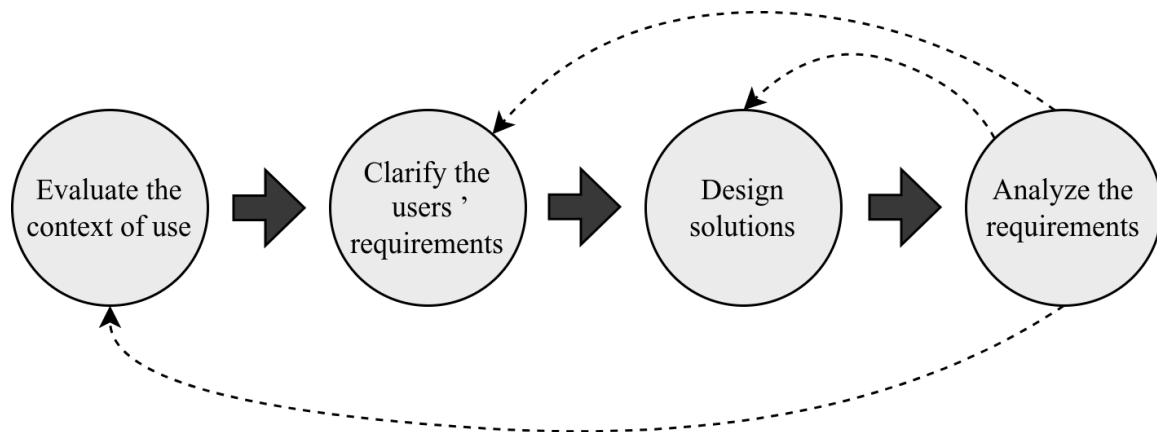


Figure 4.5: The iterative process of UX Design

and interactive. As a result, the program has been designed to be as simple and straightforward as feasible.

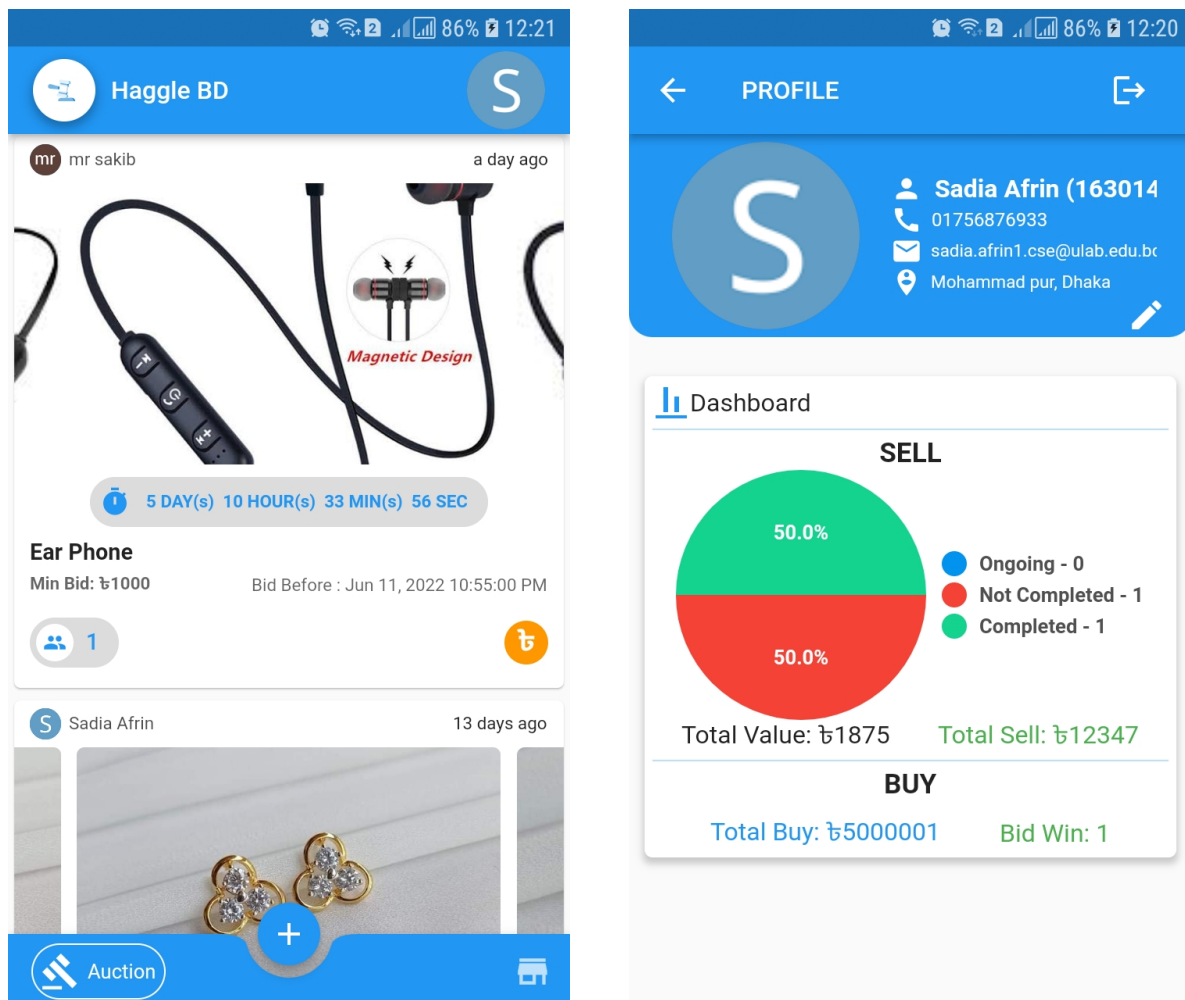


Figure 4.6: HagggleBD Interaction Design Sample

4.4 Implementation of Database

During the implementation time, the developer installs the database management system on the desired hardware. The initial data might be fresh data obtained right away or data imported from a database management system. The developer can secure the database and provide access to the many users they have defined based on their needs. As Firebase Cloud Firestore is a NoSQL cloud database, so Tables are referred as collections there. Name of the Collections and Storage are :

1. Users Collection.
2. Products collection as item.
3. Posts Images storage.

Users Collection : When a person attempts to join up, this collection stores information from their Google account.

Field Name	Field Type	Assign by
userId	String	Firebase
email	String	Google
userName	String	Google
photoURL	String	Google
joinedAt	Timestamp	System
address	String	User
cellNumber	String	User

Table 4.1: Fields of Users Collection

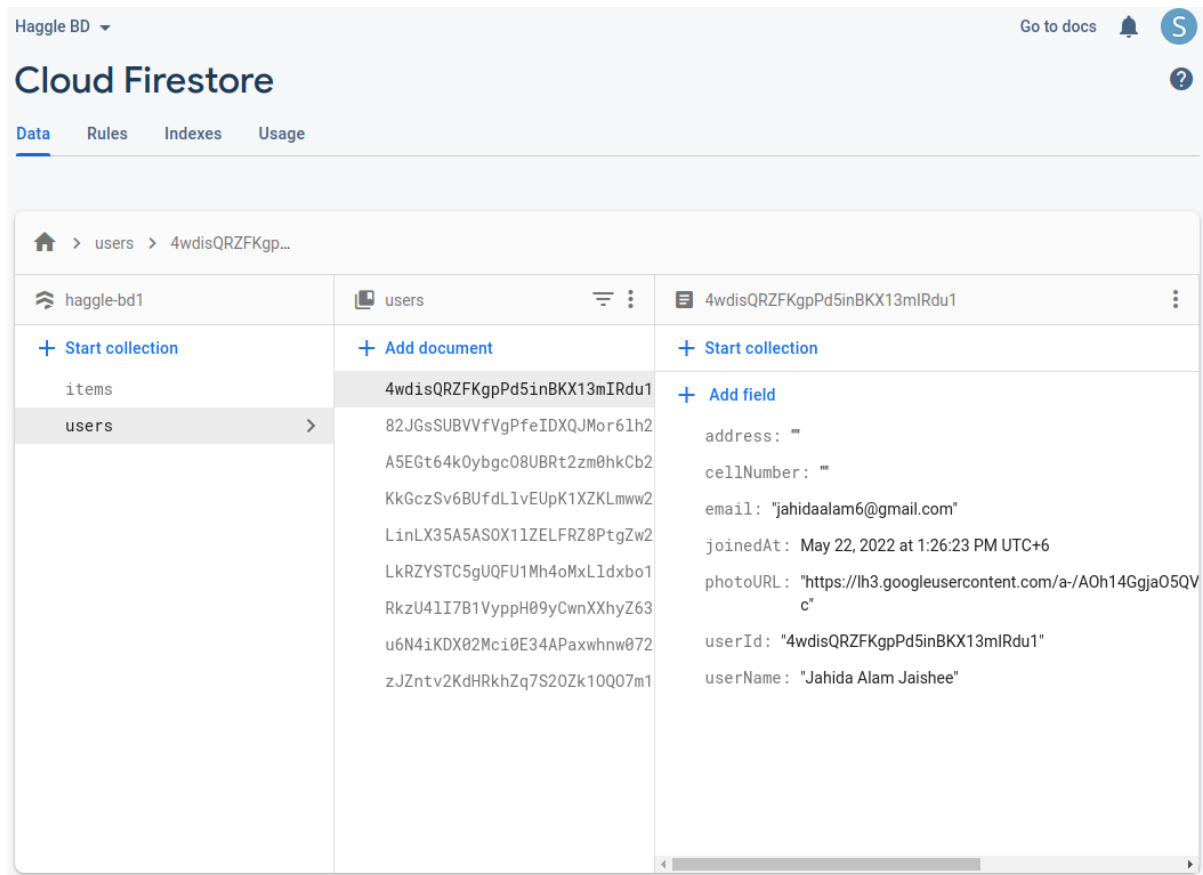


Figure 4.7: Users Collection Snapshot from Firestore

Posts Collection : During users try to add their products, the deep details are stored in this collection.

Field Name	Field Type	Assign by
postId	String	System
userId	String	Current User
productName	String	User
productDetails	String	User
minBidPrice	Integer	User
productImages	Objects of Array	User
lastBidTime	Timestamp	User
addedAt	Timestamp	System
isCompleted	Boolean	System
bidUsers	Array	System
lastBidPrice	Integer	Bid User
lastBidPrice	String	Bid User

Table 4.2: Fields of Posts Collection

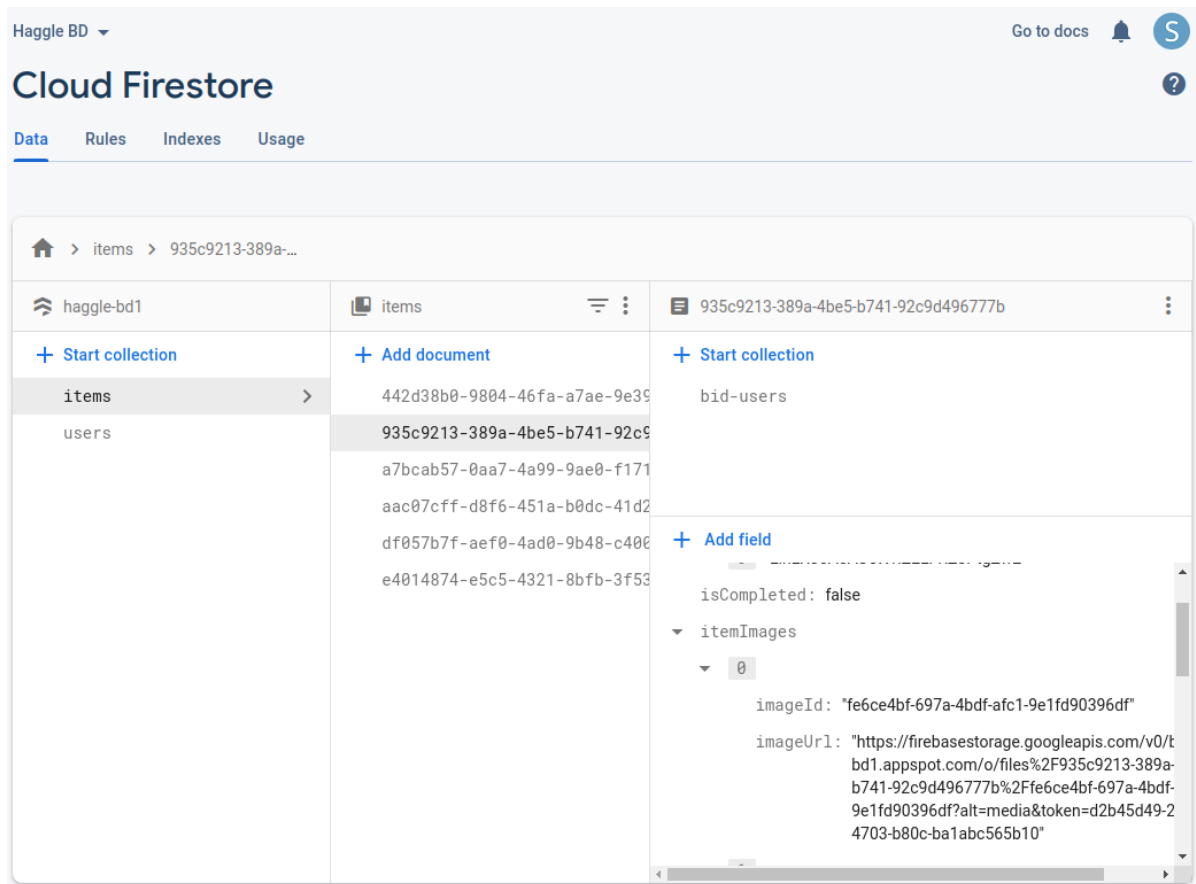


Figure 4.8: Posts Collection Snapshot from Firestore

Bid Users Collection : Users' bid information is stored in this sub-collection beneath the posts collection. When users place a bid on a product, the necessary information is saved.

Field Name	Field Type	Assign by
postId	String	Posts collection
userId	String	Current User
bidPrice	Integer	Current User
bidAt	Timestamp	System

Table 4.3: Fields of Bid Users Collection

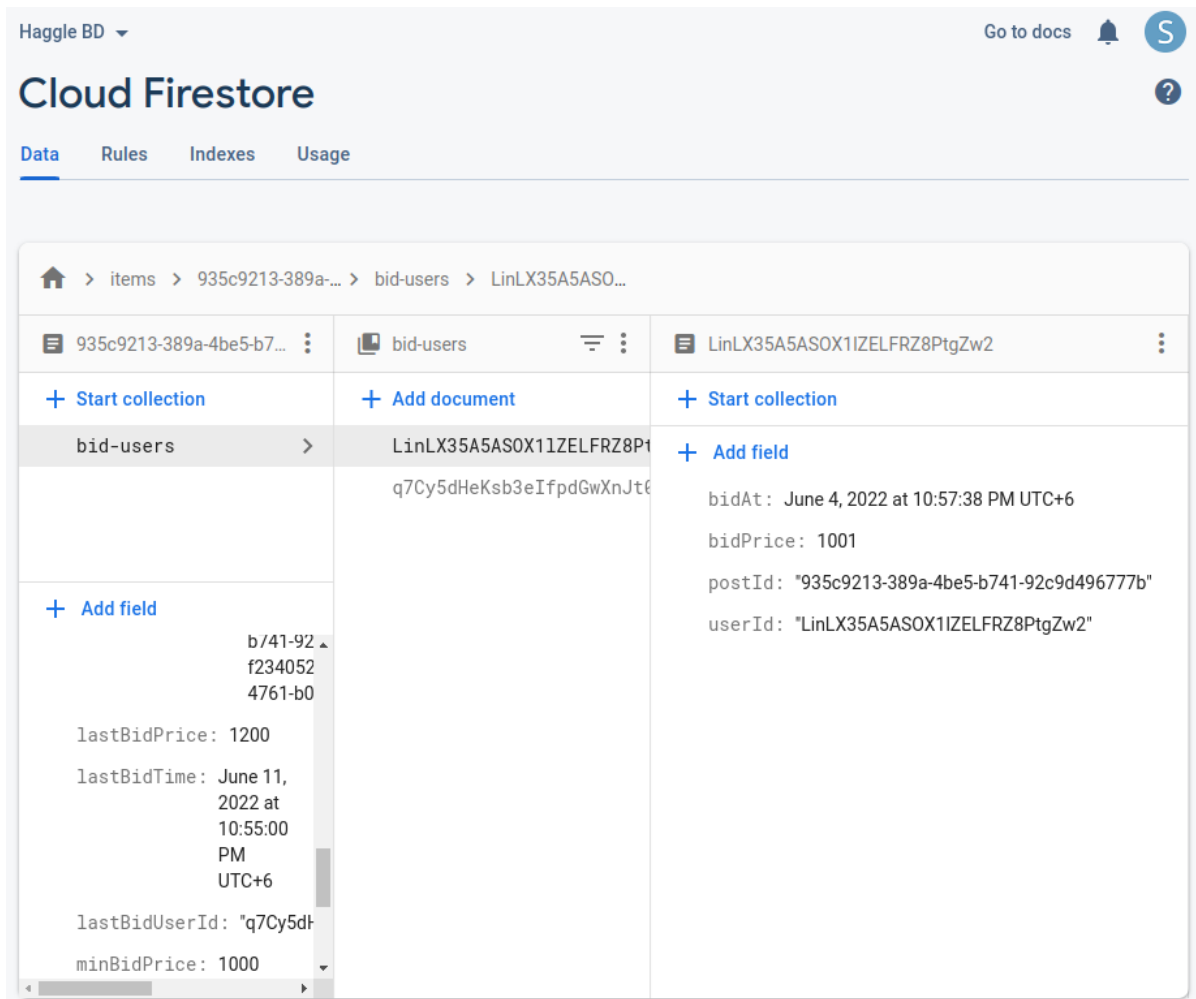


Figure 4.9: Bid Users Collection Snapshot from Firestore

Storage : Cloud storage is a cloud computing approach in which data is stored on the Internet and managed and operated by a cloud computing provider. Firebase cloud storage allows a user to store files up to 5Gb of free space. HagggleBD has been using cloud storage for storing every post's images such these can be fetched when these will be needed.

- Images are stored in folder name by posts ID.
- Every image name set by a unique ID.
- Each image has a unique URL which is stored in posts collection.

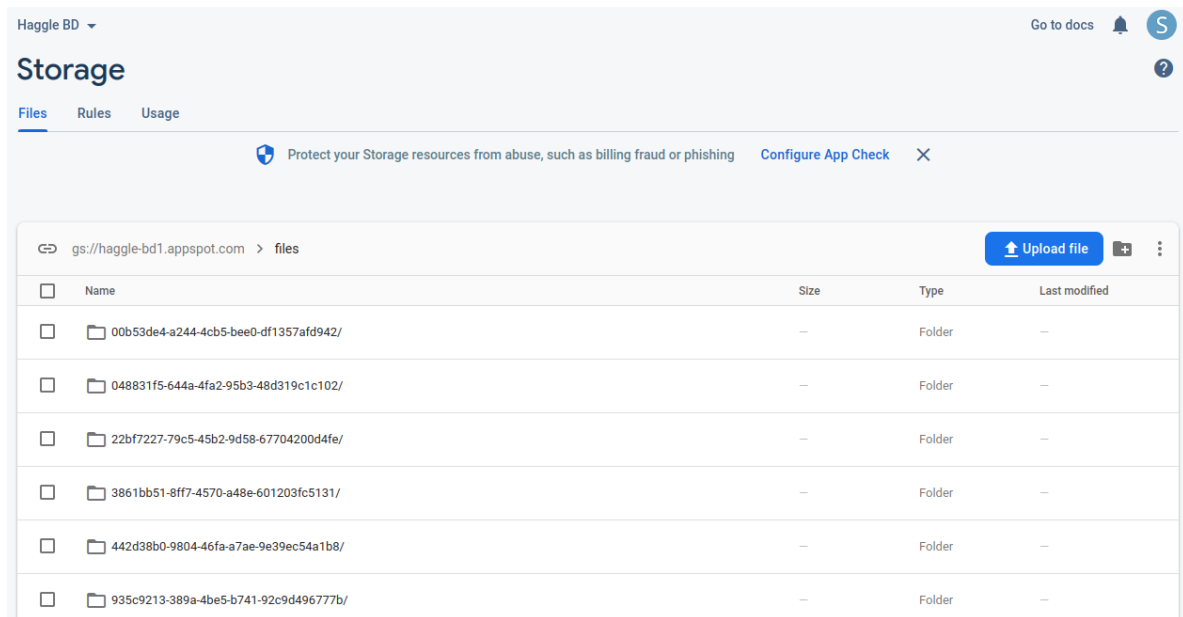


Figure 4.10: Folder name set by post ID in Storage

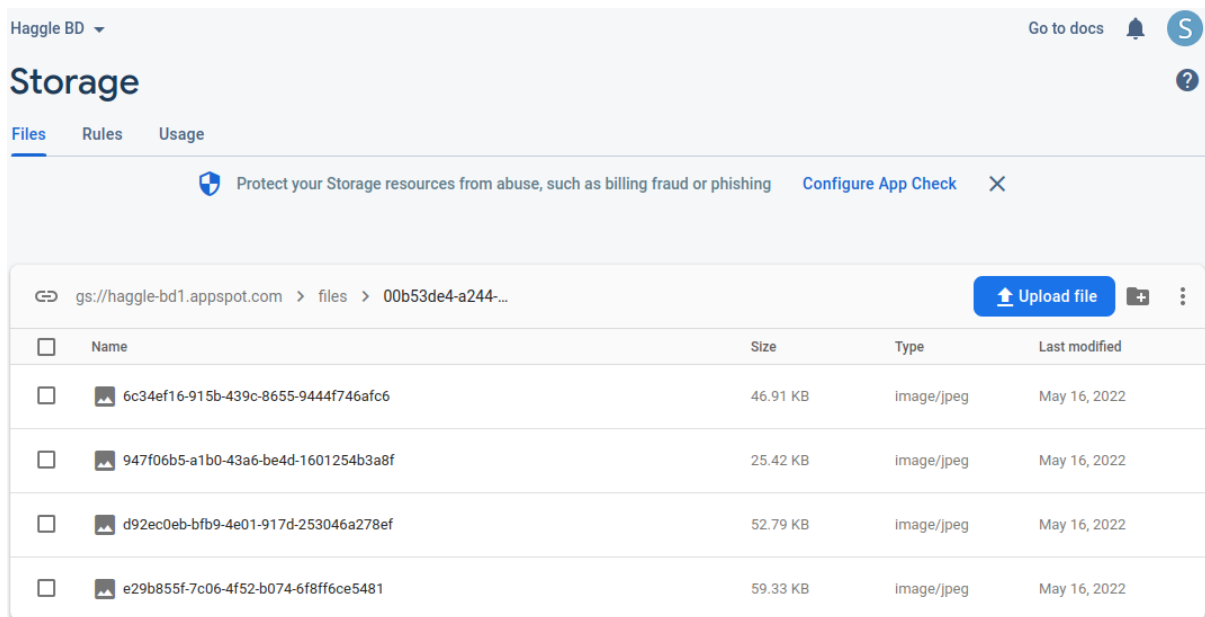


Figure 4.11: Images are by unique ID in Storage

4.5 Implementation of Front-end Design

We'll need an Android phone or an Android Virtual Device, which can be installed on any system, to execute, testing this application. Front-end Design is a crucial component of any application development that aims to make it user-friendly and functional. User experience (UX) and user interface (UI)

aspects are both part of the app design process. Designers come up with ideas, develop solutions, design the app's flow and structure, and choose colors and fonts. Designers make decisions based on customer feedback and research. The end result is a well-designed and simple-to-use app. the purpose of an application's design is to deliver seamless and effortless with a polished look. Front-end part consists of :

- Log in with Google account.
- Individual user's Profile Page.
- View and make bid other's products.
- My Granary Page for sorted logged in user's posts and bidden products.
- Products Details Page.
- User's Cell Number and Address in profile page.
- Add product page.
- Log out.

Log in With Google Account : Firebase provides Google Authentication. Users who want to use this system, must have a Google account what we know as GMAIL account. This is one click log in system without giving any password to the system. While user logging in the system for the first time, some information about the user will be stored in users collection. These information are taken form Google Account such other users can see name, profile photo.

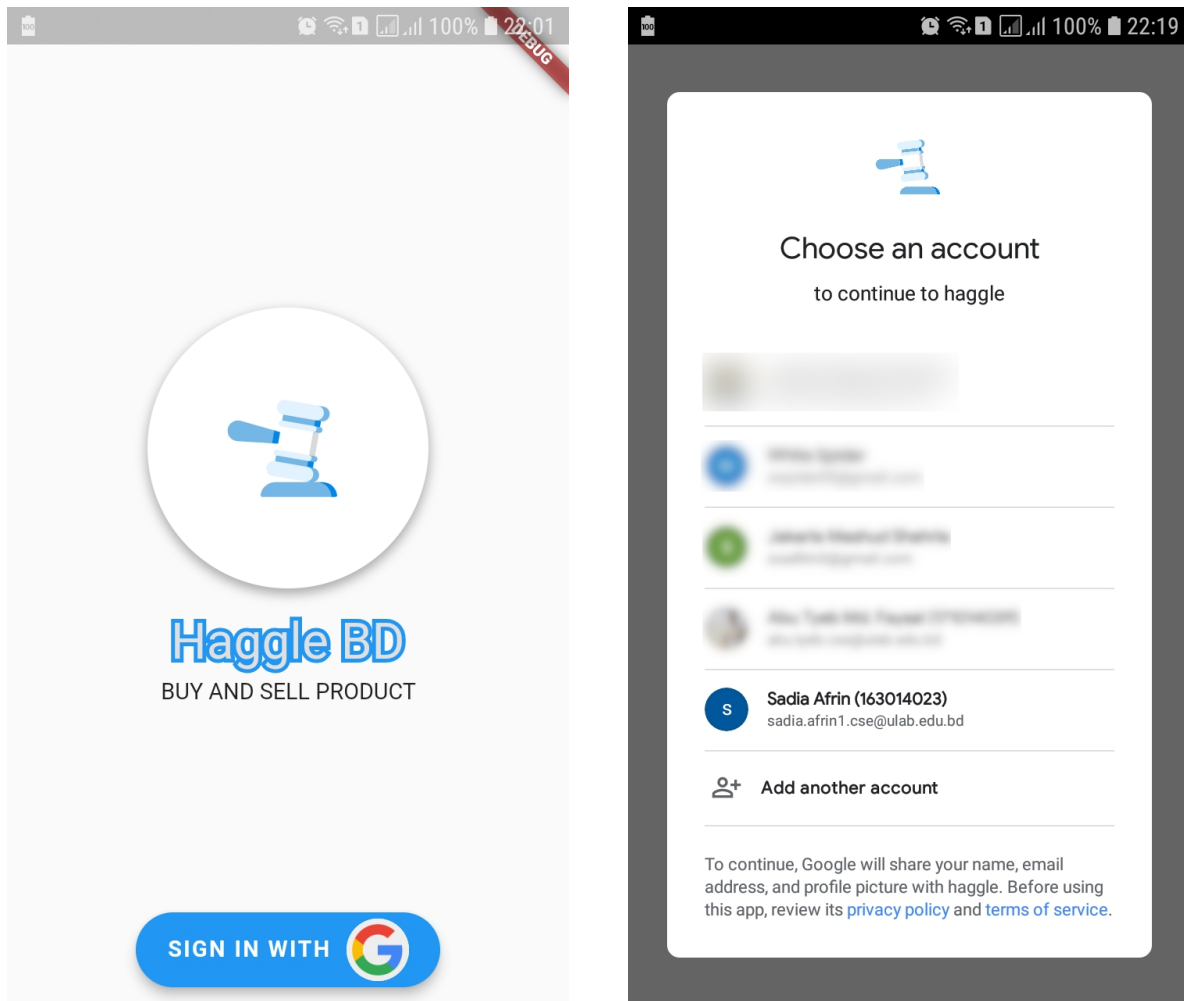


Figure 4.12: Log in by choosing account in HuggleBD

Home Page and Product Details : Home page is initial page after successfully sign up. In this page users can see all the posts about product selling, and users can route from Home Page to different page like Profile Page, My Granary Page, and can add products by clicking the plus icon in the Bottom Navigation Bar. If a user taps on a post, a product details page will open.

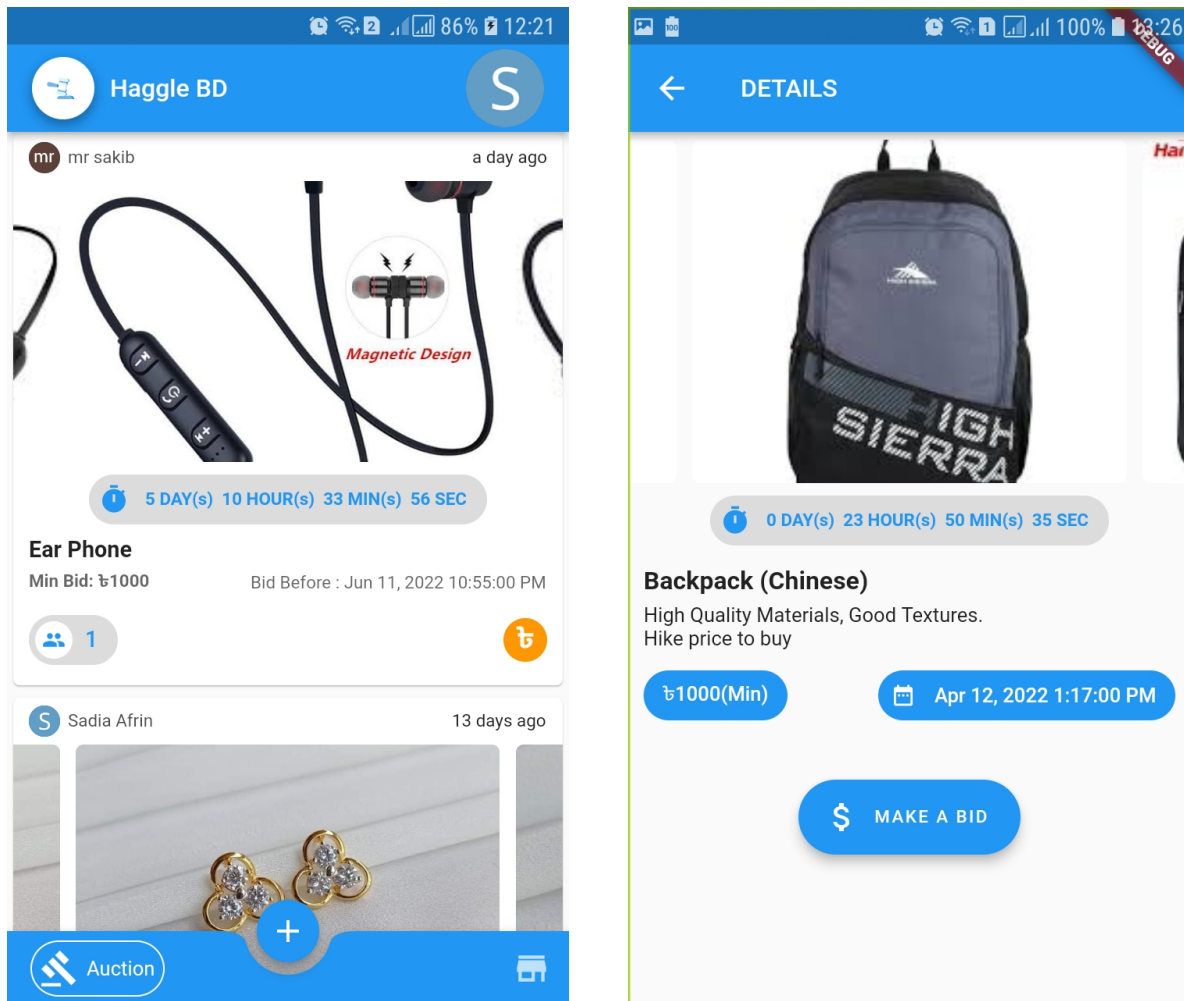


Figure 4.13: Home page and Product Details Page

Profile Page : Profile page contains user information, like user name, email address, cell number and address. There is a dashboard in the profile section. If a user sells products, a graph will be generated by the system and shows the summary of total value & total sell. If a user win in a bid, a summary about total buy and number of bid win. Address and cell number can be updated by clicking the pen icon. User also perform log out operation by clicking the top right icon in the profile page.

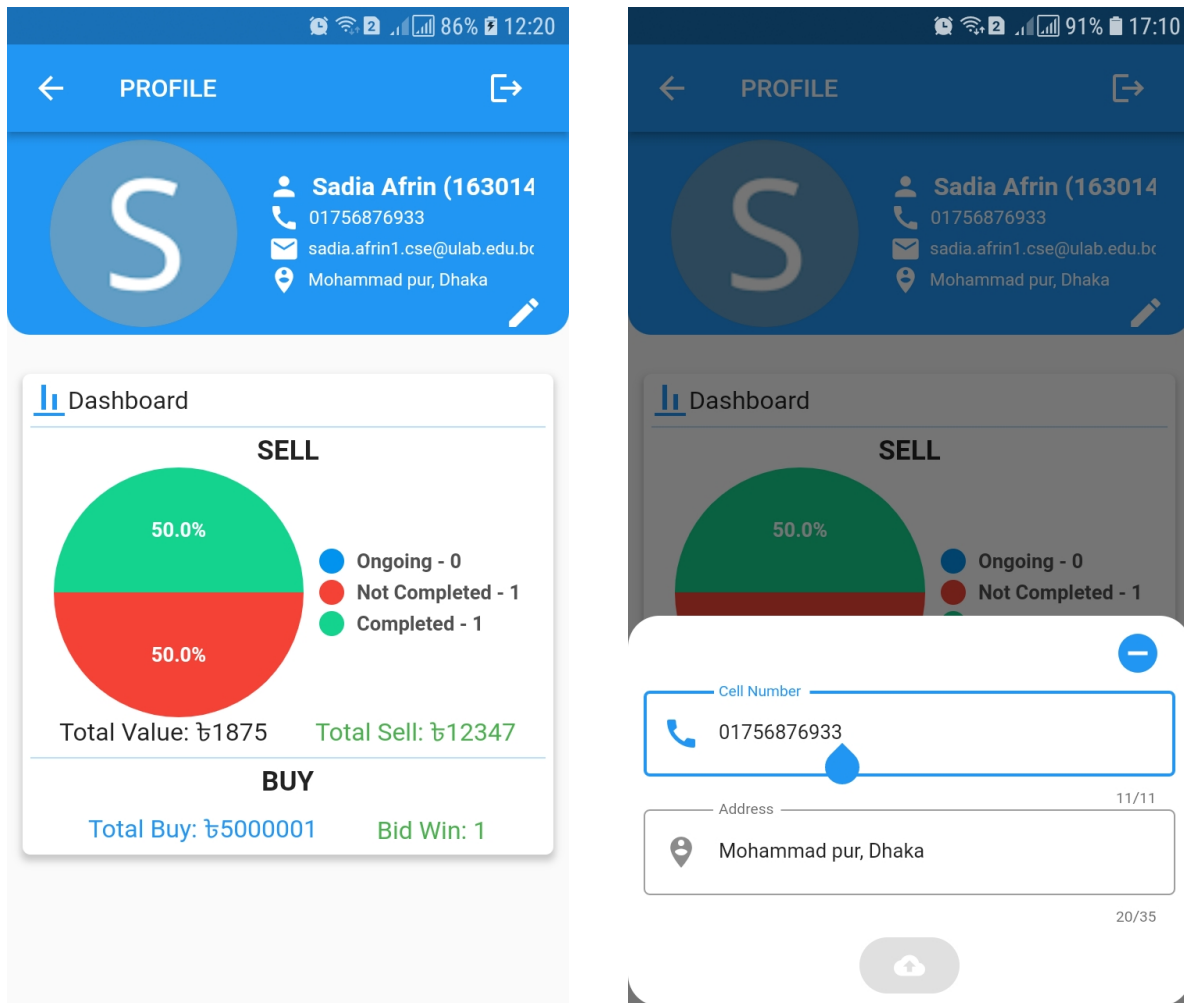


Figure 4.14: Profile page and update address & cell number

My Granary Page : To route My Granary Page user should click the the right icon button in the Bottom Navigation Bar.

- **My Items:** Shows all the Products' post added by the user. It can be navigate through clicking the top left My Items Button.
- **My Bids:** It shows all the Products' post where the user bade and hiked bid price to buy these products. By clicking My Bids button, user can navigate here.

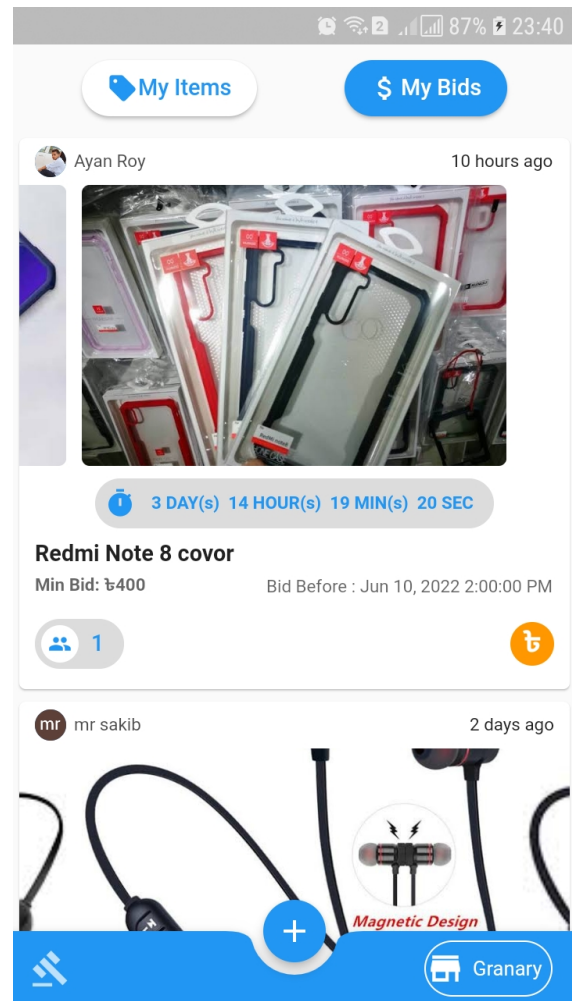
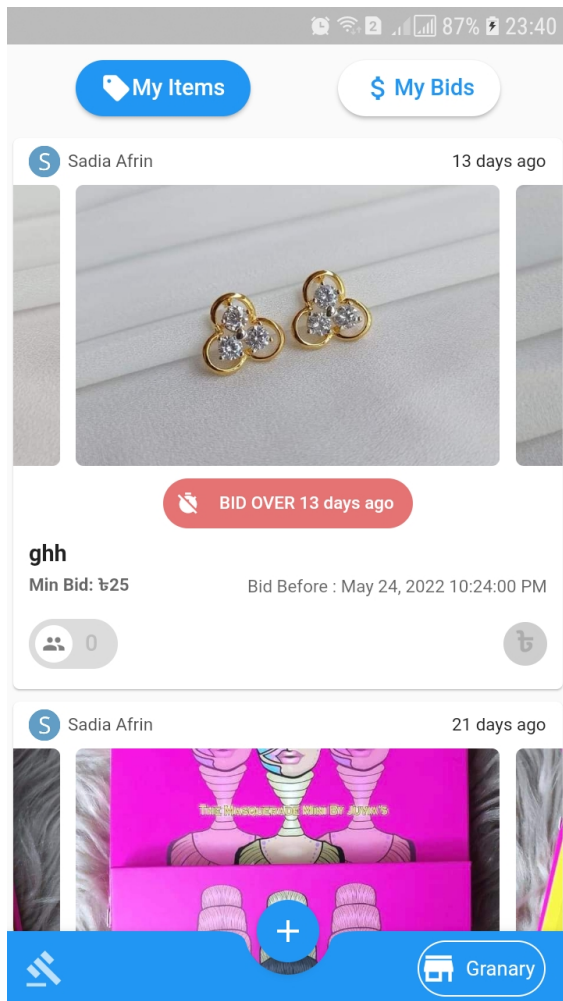


Figure 4.15: User's Products and User's Bid Products in My Granary Page

Chapter 5

Result & Discussion

5.1 Test Results & Reports

Testing phase is a step in the program development process that allows a developer to determine if the software fits the requirements or not. This is a crucial step in the software development process. The goal of testing is to find any faults, gaps, or requirements that are missing from the software. The ultimate purpose of software testing is to ensure that everything was produced according to plan or requirement. Furthermore, testing is necessary to guarantee that the software is of high quality. Testing can be done in a variety of ways. Manual testing techniques, such as unit testing, were used in this project. Individual software units are tested using a white box testing technique. The true objective of this testing is to ensure that each piece of software code works properly.

5.1.1 Test Case

A test case is a set of rules and parameters which is used to determine whether or not a system meets the expected requirements. This report includes several test scenarios to confirm that the app satisfies performance specifications.

No.	Test Cases	Case Type	Expected Result	Actual Result	Result
0	Login	Choose Google account	Display Home Page	Logged in and redirect to Homepage	Pass
1	Add Item	1. No field keeps blank. 2. Leave a field blank.	Add button enable and item can be added.	1. item can be added. 2. can't be added.	1. Pass 2. Fail
2	Bid On Item	1. Hike price $>$ min bid price. 2. Hike price $<$ min bid price.	Make bid	1. can bid. 2. can't bid.	1. Pass 2. Fail
3	update bid	1. Hike price $>$ last bid price. 2. Hike price $<$ last bid price.	Bid can be updated.	1. can update. 2. can't update.	1. Pass 2. Fail

Table 5.1: Test Cases of HagggleBD

5.2 Discussion

All of the project's requirements are being satisfied satisfactorily, as evidenced by the above-mentioned unit testing results. There were no errors, gaps, or requirements that were not met. The results of unit testing demonstrate

that everything was built according to the plan/requirement of the desired application. As a result, this Android based app satisfies all of the functional requirements.

The method makes use of the Internet as a platform to create a convenient platform for bidding, which allows information to be transferred swiftly. The greatest way to buy and sell products 'on the go' from anywhere at any time is with an Android application. As a result, the customer's bidding process becomes simpler, wiser, and less expensive. As a result, a minimum transportation cost is included, as well as alternatives for numerous modes of transportation. The program can be accessed from anywhere in the world.

Chapter 6

Impact on Society, Environment & Sustainability

6.1 Impact on Society

Consumers have the freedom to bid whenever and wherever they want, and they can participate in many auctions on the same day. Bids can be placed from a buyer's couch, work desk, kitchen, or even bed. It essentially opens the floor to all purchasers, especially those who are unable to visit the property in person. For the sellers, hosting online auctions might be less burdensome.

6.2 Impact on Environment

The auction sector can have a significant environmental impact. Shipping and logistics, which includes transporting consignments, sending out purchased auction items, and managing internal operations, account for the majority of carbon emissions. The carbon footprint of an auction house can also be increased by building upkeep and business travel.

6.3 Ethical Aspects

Online purchase is entertaining and addictive. It can soon get out of hand, even if it is less tense than an on-site auction. Many people do not feel as

if they are spending money when they shop online. Because everything is virtual, it's easy to spend far more than you anticipated.

- Users information should be safe.
- Accurate Product Listing.
- Following the Laws of Online Selling.
- Counterfeit Products for Sale.
- Data Theft & Security on the Internet.

6.4 Sustainability Plan

The auction industry learned some things after a year of internet sales and social alienation. The shift to internet venues, for example, rendered printed materials mostly obsolete.

Action 1 : Reasonable Trading in Different Parts of the World.

Develop a fair and information-free trading environment so that people all over the world can trade with confidence and goods can continue to circulate on a global scale.

- Organize online auctions that are acceptable for the industry and the products.
- Collaborate with partners to hold online auctions.
- Assessment and review that is fair and tailored to the industry and the items.

Action 2 : Enhancing the Value of Goods is a term used to describe the process of maximizing the value of goods.

Unite global purchasers, increase the value of commodities, and redistribute them.

- Improve the overall quality of all types of commodities and distribute them using the best matching methods possible.

Action 3 : Protecting the Earth in Excellent Condition.

Reduce CO2 emissions by using efficient shipping and long-term storage of products through online auctions and other platforms.

- Offset the CO2 emissions..
- When compared to physical auctions, online auctions emit less CO2.
- CO2 emissions from the disposal and creation of new commodities are avoided when used things are auctioned.

Action 4 : Collaboration with All Stakeholders

Build and promote circular distribution with all kinds of partners outside of industries, regions, and countries to broaden the reach of sustainability.

- It's a membership service.
- Collaboration with manufacturing enterprises.
- In partnering with community people.

Chapter 7

Conclusion & Future Scope

7.1 Discussion and conclusion

Customers have become more efficient and efficient in their behavior, and businesses have risen to new heights as a result of the online auction system, requiring many to make the required adjustments and changes in order to attract a new market of knowledgeable consumers. The rapid expansion of e-auctions has resulted in a global retail infrastructure e-transformation. Despite many barriers, thanks to a growing internet, more salaries, and a more educated population. Secure online payments, suitable for electronic stores, return policies, and thrilling discounts help you comprehend the auction system's advantages. Companies can get more online clients and boost their e-business revenue by better understanding the behavior of the consumer online auction system. Consumers, on the other hand, are more likely to make purchases online now that they are aware of the advantages of e-auction. With the increasing popularity of the Internet, the number of Internet users continues to rise, and an increasing number of Internet users are becoming frequent online shoppers.

7.2 Future Work

It is impossible to create a system that meets all of the user's criteria. As the system is used, the needs of the users change. The following are some of the prospective enhancements that can be made to this system: As new technology arises, the system can be upgraded and adapted to the required environment. Because it is built on object-oriented design, any future modifications are simple to implement. Security can be improved utilizing developing technology based on future security challenges. It is possible to add a sub admin module. It is possible to include a built-in web browser. The project's long-term goal is to enhance the design, implementation, and documentation so that anyone can use it to improve their performance. We'll make the site more dynamic and ensure that the database functions properly. We will add the following module in the future to improve the project: More system security, and a more user-friendly system.

Future implementation is important in Application Developing. As a result, to stay ahead of the curve, the app, like other businesses, should begin integrating the latest technology and trends. Prior to that, it must be aware of future mobile app development trends and technologies in order to create a successful app development plan. This will almost certainly result in a successful app development.

Stand-alone application can't rule the market now-a-days. Application must be adapt with the new technologies and increment features day by day to

rule the applications market. HagggleBD will need more features.

- Payment Method.
- Confirming Products Delivery.
- Impressive Design.
- Deploy to other Platforms.
- Make the app more reliable.

Payment Method : The main next feature will be payment method. There will be no cash payment, but online must be. For local users there will be Mobile banking payment methods, and who will want to buy products from abroad, there will be VISA payment method firstly. After then all other methods will be added incrementally.



Figure 7.1: Nagad, bKash and VISA - Payment Method

Confirming Products Delivery : Every package delivered will be accompanied by an electronic proof of delivery form and a delivery receipt generated by the Product Delivery Confirmation. It will need to sure that after receiving payment from the purchaser, the products he/she has won by bidding, safely delivered the designated address. Review system will have to be implemented as users can write their experiences and suggestions. HagggleBD may have follow either one of the method of these two for delivering products to the

consumers end:

1. Create self shipping service to deliver products.
2. User third-party vendors like Patao, RedX shipping services.

Impressive Design : The quality of the user experience is usually what distinguishes a good app design from a bad one. Your design should include elements such as quick loading speeds, ease of use, and overall consumer pleasure during an engagement. Great app design is well-organized, easy to use, and appealing to the eye. HagggleBD will follow:

- Easy way to Navigate.
- Eye catching.
- Accurate colors.
- Keeps things simple to understand.

App icons with appealing designs have a higher chance of being spotted and allow users to explore more of the app's features. Beauty and quick greater self - understanding are two key components in an effective app icon design.

The title is an important part of your App Store Optimization strategy.

Deploy to other Platforms : Now-a-days to keep business running well in this competition era, one platform is not enough for any kind of application. For this competition, the Android platform is insufficient. There are a plenty of platforms where users may gathered. HagggleBD will be deployed in these following platforms as its source code is written for the almost all recognizable

platforms such as:

- iOS - Apple Smartphone's Platform.
- MacOS - Apples Desktop/Laptop's Platform.
- Windows.
- Linux.
- Web (Some code may be modified to run in the web).

As a new application, it's difficult to maintain its position in the market, even if HagggleBD has come up with some innovative concepts. I hope HagggleBD maintains its market position.

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